

WHAT IS CLAIMED IS:

1           1. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration comprising at least one non-woven fabric  
3 layer made of collagen fibers, or having at least one non-  
4 woven fabric layer made of collagen fibers and at least one  
5 sponge layer made of collagen, characterized in that a  
6 surface of the membrane is provided with a coating layer of  
7 gelatin or hyaluronic acid.

1           2. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the coating  
3 layer containing gelatin or hyaluronic acid is a sponge or  
4 film.

1           3. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the coating  
3 layer containing gelatin or hyaluronic acid comprises cross-  
4 linked gelatin or hyaluronic acid.

1           4. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the coating  
3 layer containing gelatin or hyaluronic acid is formed by  
4 lyophilization.

1           5. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the coating  
3 layer containing gelatin or hyaluronic acid is a compressed  
4 sponge layer.

1           6. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the coating  
3 layer containing gelatin or hyaluronic acid has a thickness  
4 of 0.05 mm to 20 mm.

1           7. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the  
3 collagen of the collagen fibers and the collagen of the at  
4 least one sponge layer are independently selected from  
5 enzyme-solubilized collagen, acid-solubilized collagen,  
6 alkali-solubilized collagen or neutral solubilized collagen.

1           8. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein a part or  
3 all of the collagen in the non-woven fabric layer made of  
4 collagen fibers comprises a cross-linked collagen.

1           9. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the non-

3 woven fabric layer made of collagen fibers is obtained by  
4 coagulating collagen fibers which are extruded and crossed  
5 over in multiple folds, or extruded and wound on a plate in  
6 a certain direction to have paralleled lines of fibers, and  
7 compressing the coagulated fibers.

1 10. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the non-  
3 woven fabric layer made of collagen fibers is a layer in  
4 which the fibers are joined together using a binder comprised  
5 of solubilized collagen solution.

1 11. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the non-  
3 woven fabric layer made of collagen fibers has a thickness of  
4 0.05 mm to 100 mm and the coating layer made of gelatin or  
5 hyaluronic acid has a thickness of 0.050 mm to 20 mm.

1 12. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the  
3 membrane is composed of a laminated membranous substance  
4 having one to six layers of the non-woven fabric layer made  
5 of collagen fibers.

1 13. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the  
3 collagen non-woven fabric layer has fibers having a fiber  
4 diameter of 5  $\mu\text{m}$  to 1.0 mm, and a bulk density (fiber  
5 density) of  $5 \times 10^{-4}$  to  $5 \text{ g/cm}^3$ .

1 14. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 1, wherein the overall  
3 thickness of the membrane is 0.1 mm to 50 mm.

1 15. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration comprising: a compressed non-woven fabric  
3 layer composed of cross-linked collagen fibers wherein the  
4 layer has fibers having a fiber diameter of 20 to 100  $\mu\text{m}$ , a  
5 bulk density of  $1.0 \times 10^{-3}$  to  $5.0 \times 10^{-2} \text{ g/cm}^3$  and a thickness  
6 of 0.2 mm to 1.0 mm; and a coating layer containing gelatin  
7 or hyaluronic acid covering each surface of the compressed  
8 collagen non-woven fabric layer; and wherein the membrane has  
9 a thickness of 0.5 mm to 2.0 mm.

1 16. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration comprising: a laminate of two or three  
3 compressed non-woven fabric layers each composed of cross-  
4 linked collagen fibers wherein each layer has fibers having

5 a fiber diameter of 150 to 250  $\mu\text{m}$ , a bulk density of 0.05 to  
6 2.0  $\text{g}/\text{cm}^3$  and a thickness of 0.5 mm to 2.0 mm; and a coating  
7 sponge layer containing gelatin or hyaluronic acid covering  
8 each surface of the laminate of non-woven fabric layers; and  
9 wherein the membrane has a thickness of 1.0 mm to 4.0 mm and  
10 is heat cross-linked.

1 17. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration comprising a laminated membranous  
3 substance having at least one non-woven fabric layer made of  
4 collagen fibers and at least one sponge layer made of  
5 collagen, characterized in that a surface of the laminated  
6 membranous substance is provided with at least one layer  
7 containing gelatin or hyaluronic acid.

1 18. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein the coating layer containing gelatin or  
3 hyaluronic acid is a sponge or film.

1 19. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein the coating layer containing gelatin or  
3 hyaluronic acid comprises cross-linked gelatin or hyaluronic  
4 acid.

1           20. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein the layer containing gelatin or  
3 hyaluronic acid is formed by lyophilization.

1           21. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein either the at least one non-woven fabric  
3 layer or at least one sponge layer in the laminated  
4 membranous substance is compressed, or the membranous  
5 substance is compressed.

1           22. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 17, wherein the  
3 coating layer containing gelatin or hyaluronic acid has a  
4 thickness of 0.05 mm to 20 mm.

1           23. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein the collagen of the collagen fibers and  
3 the collagen of the at least one sponge layer are  
4 independently selected from enzyme-solubilized collagen,  
5 acid-solubilized collagen, alkali-solubilized collagen or  
6 neutral solubilized collagen.

1           24. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein a part or all of the laminated

membranous substance comprising at least one non-woven fabric layer made of collagen fibers and at least one sponge layer made of collagen comprises a cross-linked collagen.

25. A suturable adhesion-preventing membrane according to claim 17, wherein the at least one non-woven fabric layer made of collagen fibers is a layer obtained by coagulating collagen fibers which are extruded and crossed over in multiple folds, or extruded and wound on a plate in a certain direction to have parallel lines of fibers, and compressing the coagulated fibers.

26. A suturable adhesion-preventing membrane according to claim 17, wherein the at least one non-woven fabric layer made of collagen fibers is a layer in which the fibers are joined together using a binder comprised of solubilized collagen solution.

27. A suturable adhesion-preventing membrane according to claim 17, wherein the at least one non-woven fabric layer made of collagen fibers has a thickness of 0.05 mm to 10 mm, the at least one sponge layer made of collagen has a thickness of 0.05 mm to 20 mm and the coating layer containing gelatin or hyaluronic acid has a thickness of 0.05

7 mm to 20 mm.

1 28. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein one to six layers of the at least one  
3 non-woven fabric layer made of collagen fibers are laminated  
4 with one to four layers of the at least one sponge layer made  
5 of collagen, and further, one to four layers of gelatin or  
6 hyaluronic acid layer are laminated thereon, and as a whole,  
7 three to fourteen layers are contained.

1 29. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein the at least one non-woven fabric layer  
3 made of collagen fibers has fibers having a fiber diameter of  
4 5  $\mu\text{m}$  to 1 mm and a bulk density (fiber density) of  $5 \times 10^{-4}$  to  
5 5 g/cm<sup>3</sup>.

1 30. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration according to claim 17, wherein the  
3 overall thickness of the membrane is 0.1 mm to 50 mm.

1 31. A suturable adhesion-preventing membrane according  
2 to claim 17, wherein the at least one sponge layer made of  
3 has a porosity area of 10 to 90 %.



1           32. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration, comprising: a laminated membranous  
3 substance that has a first layer of a compressed collagen  
4 sponge layer, a second layer of a chemically cross-linked and  
5 compressed collagen non-woven fabric layer, and a third layer  
6 of a compressed collagen sponge layer; and a coating layer  
7 containing gelatin or hyaluronic acid, covering each surface  
8 of the laminated membranous substance.

1           33. A suturable adhesion-preventing membrane for guided  
2 tissue regeneration comprising: a laminated membranous  
3 substance that has a first layer and a second layer of a  
4 chemically cross-linked and compressed collagen non-woven  
5 fabric; compressed collagen sponge layers provided on both  
6 sides of the laminated membranous substance; and a coating  
7 layer containing gelatin or hyaluronic acid, covering each  
8 sponge layer.